20-1025 (Lead); 20-1138 (Consolidated)

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

ENVIRONMENTAL HEALTH TRUST; CONSUMERS FOR SAFE CELL PHONES; ELIZABETH BARRIS; THEODORA SCARATO

CHILDREN'S HEALTH DEFENSE; MICHELE HERTZ; PETRA BROKKEN; DR. DAVID O. CARPENTER; DR. PAUL DART; DR. TORIL H. JELTER; DR. ANN LEE; VIRGINIA FARVER, JENNIFER BARAN; PAUL STANLEY, M.Ed.

Petitioners

v.

FEDERAL COMMUNICATIONS COMMISSION; UNITED STATES OF AMERICA

Respondents

Petition for Review of Order Issued by the Federal Communications Commission

BRIEF OF AMICUS CURIAE JOSEPH SANDRI IN SUPPORT OF PETITIONERS URGING REVERSAL

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CERTIFICATE AS TO PARTIES, RULINGS AND RELATED CASES

Pursuant to Federal Rule of Appellate Procedure 26.1 and D.C. Circuit Rules 26.1 and 28(a)(1), Amicus Joseph Sandri certifies as follows:

I. Parties and Amici.

(A) Petitioners

"EHT Petitioners" 20-1025
(lead) Environmental Health Trust Consumers for Safe Cell Phones Elizabeth Barris
Theodora Scarato

"CHD Petitioners" 20-1138 (consolidated)
Children's Health Defense Michele Hertz
Petra Brokken
Dr. David O. Carpenter Dr. Paul Dart
Dr. Toril H. Jelter Dr. Ann Lee Virginia Farver
Jennifer Baran
Paul Stanley, M.Ed.

(B) Respondents

Federal Communications Commission United States of America

Amicus Joseph Sandri does not know the identity of other Amici.

II. Ruling under Review. FCC, *Resolution of Notice of Inquiry, Second Report and Order* and the *Memorandum Opinion and Order*, addressing *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*, ET Docket No. 03-137, and *Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies*, ET Docket No. 13-84, in FCC 19-126; 85 Fed. Reg. 18131 (Ap. 1, 2020).

III. Related Cases

None.

August 5, 2020

Respectfully submitted,

/s/ Stephen L. Goodman

Stephen L. Goodman

RULE 26.1 STATEMENT

Amicus is an individual.

RULE 29 STATEMENTS

The Petitioners have indicated their its consent to the filing of this brief.

Pursuant to Fed. R. App. P. 29(c)(5), amicus states that no party or party's counsel authored this brief in whole or in part, and that no party or party's counsel contributed money that was intended to fund preparing or submitting the brief.

Pursuant to D.C. Cir. R. 29(d), amicus states that a separate brief is necessary for the following reasons:

Amicus is intimately familiar with the wireless industry, and in particular many of the frequency bands newly-made available for Fifth Generation ("5G") wireless services. With extensive experience as a wireless company executive and regulatory attorney, Amicus brings a perspective significantly different from the others submitted in this case.

August 5, 2020

Respectfully submitted,

/s/Stephen L. Goodman

Stephen L. Goodman

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Other Authorities:

GLOSSARY OF ABBREVIATIONS

4G	Fourth Generation wireless services
5G	Fifth Generation wireless services
FCC	Federal Communications Commission
NIEHS	National Institute of Environmental Health Sciences
NSMA	National Spectrum Management Association
NTP	National Toxicology Program
RF/EMF	Radiofrequency and electromagnetic fields
RFR	Radiofrequency radiation

STATEMENT OF INTEREST

I am JOSEPH M. SANDRI, and have worked over three decades in the wireless industry. The views expressed herein are my own. My experience in the licensing and deployment of wireless networks—including the drafting of corporate human RF exposure compliance policies for microwave and millimeter wave band system deployments—reinforces the importance of health and safety in connection with RF/EMF. I have learned to rely upon the expertise of scientists and health care experts in assessing these issues. I am submitting this brief to ensure that these perspectives are fully considered by the Court

INTRODUCTION AND SUMMARY OF THE ARGUMENT

The FCC wisely decided to re-examine its health and safety regulations in light of significant changes in the wireless industry since those rules were last amended in 1996. A fourth generation of wireless services has been deployed, and the fifth generation of wireless services is being deployed at present. In addition to the spectrum used by wireless service in the 1990's, these wireless services operate in new, higher frequency bands, using greater bandwidth and wider channels to provide significantly greater capacity. Many of these newer systems' base-stations are installed at

street-level, and those are much closer to human beings. Simultaneously, people are carrying and using more wireless devices as usage of wireless services has grown exponentially. Yet despite these significant changes, the FCC failed to give adequate consideration to studies undertaken subsequent to the 1996 rules when the FCC decided not to make any material changes to those rules. In fact, despite the fact that the FCC is not a health care agency, it has not demonstrated that it ever (i) required wireless device manufacturers and systems operators to insure the public against major RF injuries that may be caused by those devices and systems, and (ii) even wrote the major U.S. healthcare and environmental agencies and actively acquired peer-reviewed studies from each of them regarding matters on the record that are within their areas of expertise. As a result, the FCC's decision was arbitrary and capricious, in violation of the Administrative Procedures Act.

ARGUMENT

The FCC Is Not A Healthcare Agency and It Failed to Give Adequate Consideration to Studies Demonstrating the Potential Adverse Health Effects of 4G and 5G Wireless Services, Let Alone Adequately Engage U.S. Healthcare and Environmental Agencies

I am JOSEPH M. SANDRI, and have worked over three decades in the wireless industry. The views expressed herein are my own.

I am currently President of the National Spectrum Management Association (NSMA)(https://www.nsma.org/about-us/nsma-officers/). The NSMA is a voluntary international association of microwave radio/wireless and satellite frequency coordinators, licensees, manufacturers and regulators. Established in 1984, the Association provides a forum to develop industry guidelines for efficient use and management of the frequency spectrum by the wireless telecommunications community. NSMA provides a linkage between government regulations and industry practice by developing recommendations that streamline and standardize procedures used by the frequency coordination community. NSMA strives to provide an open forum for stakeholders to mold responsible spectrum industry practice and resolve conflicts.

I am also CEO of Thought Delivery Systems, Inc., which is active in 5G infrastructure operations, applications, and research & development through its Cardinal Communications division. The parent company is also active in software development. I have been an executive officer with multiple publicly traded corporations. Recently, I was co-president of FiberTower Corporation which was sold to AT&T on February 9, 2018. The millimeter band spectrum assets that FiberTower sold to AT&T are part of their 5G deployment strategy. I was president of IDT Spectrum prior to FiberTower. IDT Spectrum's successor company, StraightPath Communications, sold all its 5G millimeter wave licenses

to Verizon in 2018. The millimeter band spectrum assets that were sold to Verizon are part of their 5G deployment strategy.

I have served on several boards in the technology and public service sectors. Prior to these executive experiences, I served in private practice for a Washington, DC law firm, representing numerous Fortune 100 companies in telecommunications matters. I have training and experience in communications law, journalism and radiofrequency engineering. I hold a Certification from the Institute for Communications Law Studies and a Juris Doctor from the Columbus School of Law, Catholic University of America, Washington, DC, and a B.S. in Journalism from the University of Maryland – College Park. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and am a long-standing board member of the National Spectrum Management Association (NSMA). I am on the board of the Archangel Ancient Tree Archive. Prior to law school I was Sport Director and Sports Anchor for CBS Television affiliate WRBL-TV. I thus bring extensive experience and a broad perspective to this proceeding.

It is my opinion that the FCC did not properly review the extensive record in the Human RF Exposure proceeding. Because the FCC is not primarily a healthcare or an environmental protection agency it has a special duty to review the work of experts from those fields and also a duty to make written requests

to the various expert agencies, including and not limited to Health and Human Services (HHS), Environmental Protection Agency (EPA), and the National Institute of Environmental Health Sciences (NIEHS). It does not appear that the FCC provided evidence that it met minimal requirements to review the record in this proceeding, let alone that it even wrote numerous agencies of subject matter expertise, seeking their input. Nor does the record show that the FCC has required wireless device manufacturers and systems operators to secure insurance against material radio frequency exposure harms to the public Thus it seems clear that the review the FCC conducted was not in compliance with the Administrative Procedures Act (APA) or the National Environmental Policy Act (NEPA). It does not appear that the FCC provided human beings the interference protections that it normally provides to radio-frequency transmitting and receiving devices and networks before they are certified for use. As a matter of FCC record, such devices and networks are surveyed on substantially more harmful interference criteria than is the human body.

Regarding human RF exposure health implications, a statement from Linda Birnbaum follows, as one of many examples of the information the Commission failed to adequately address. Dr. Birnbaum has unquestionable expertise in this area.

Highly Relevant Information was not Considered by the Commission in Reaching its Decision

As reflected in the following statement of Dr. Birnbaum, there were significant scientific studies conducted by other federal agencies that were not adequately considered in the FCC's decision not to update its RF health and safety regulations:

I am LINDA S. BIRNBAUM and am currently a Scholar in Residence in the Nicholas School of the Environment of Duke University and a Scientist Emeritus at the National Institute of Environmental Health Sciences (NIEHS). I recently retired after 40 years as a federal scientist. From early 2009-late 2019, I was the Director of the NIEHS, one of the 27 institutes and centers of the National Institutes of Health. I was also the Director of the National Toxicology Program (NTP), a cross Department of Health and Human Services organization which involves not only NIH, but also the Food and Drug Administration and the Centers for Disease Control and Prevention. Prior to this I spent 19 years in the Office of Research and Development of the United States Environmental Protection Agency (EPA), directing the agency's largest health research division for 16 years, the Human Studies Division (clinical studies and epidemiology) for 1 year, and the cross-EPA effort on asbestos in Libby, Montana which brought together the researchers, the policy makers, and those involved in cleaning up an extensive Superfund site. My first 10 years in government were at NIEHS where I advanced from a tenure track scientist to tenure and group leadership in the NTP.

Prior to joining the government, I spent 4 years as a research scientist at the Masonic Medical Research Laboratory in Utica, NY winning a National Research Services Fellowship to investigate the biochemical basis of aging and cancer. This was preceded by one year as a visiting assistant professor of science at Kirkland College (now part of Hamilton College) in Clinton, NY. Prior to that, I completed a prestigious Damon Runyon postdoctoral fellowship in cancer research at the University of Massachusetts, Amherst after receiving my MS and

PhD in microbiology at the University of Illinois, Urbana-Champaign. I received AB magna cum laude from the University of Rochester in 1967.

I am an adjunct professor in the Curriculum of Toxicology at the University of North Carolina, Chapel Hill and in the Department of Environmental Sciences and Engineering in the Gillings School of Public Health. I am also an adjunct professor in the Integrated Toxicology Program at Duke University, Durham. I have received honorary doctorates from the University of Rochester, Ben Gurion University in Israel, and Amity University in India. I am a Past President of the Society of Toxicology, past Vice President of the International Unit of Toxicology, and past chair of the Division of Toxicology of the American Society of Pharmacology and Therapeutics. I have published over 800 peer reviewed publications, book chapters, and reports, and am a Diplomate of the American Board of Toxicology and a Fellow of the Academy of Toxicological Sciences.

I was awarded the North Carolina Award in Science in 2016. I was elected to the National Academy of Medicine in 2010, which is one of the National Academies of Science, Engineering, and Medicine, one of the highest honors in the fields of medicine and health. I was also elected to the Collegium Ramazzini in 2009, an independent, international academy of only 180 internationally renowned experts in the fields of occupational and environmental health. Amongst more than 60 other awards are U.S. EPA Gold Award for Scientific Achievement in the Health Sciences, National Institutes of Health Director's Award, National Research Center for Women's 2012 Health Policy Hero Award, Surgeon General's Medallion 2014, and the APHA Calver Award.

The NTP was established in 1978 by Secretary of Health, Education, and Welfare Joseph Califano and headquartered at NIEHS, with the Director of NIEHS also being the Director of the NTP. In addition to the NIEHS, the National Center for Toxicological Research, a division of the FDA, and the National Institute of Occupational Safety and Health, a division of the CDC, are also part of the NTP. The executive committee of the NTP includes the heads of the following agencies (or their designees): EPA, FDA, DoD, OSHA, CPSC, ATSDRs/NCEH, NIOSH, NIEHS, and the National Cancer Institute.

The mission of the NTP is to conduct toxicology testing and develop new approaches, coordinate toxicology testing across the Federal Government, evaluate hazardous substances, and provide direction to a multi-Agency effort to develop alternative test methods. The NTP has been conducting rodent

bioassays which are considered the gold standard for toxicology testing. Every agent known to cause cancer in humans will also produce it in animals when adequately tested. Thus, NTP studies are deemed valuable to policymakers around the world in advising about potential threats to human health that may be amenable to reduction or control, such as benzene, asbestos, ionizing radiation or other substances. The NTP has conducted over 600 2-year bioassays in male and female rats and mice which not only look for cancers but also for chronic health effects. The NTP has evaluated over 200 substances for the legislatively mandated and authoritative Report on Carcinogens. Compounds evaluated as known or reasonably anticipated to be human carcinogens must be labeled as such by EPA, OSHA, and California EPA. NTP scientists have played key roles with the International Agency for Research on Cancer (IARC), part of the WHO, in their monograph series which evaluated chemicals for cancer. NTP scientists have also played many other leadership roles both nationally and internationally, in the Society of Toxicology and the International Union of Toxicology, among others.

The NTP cell phone studies were initiated by a request from FDA in 1999 because of the increasing use of cell phones both in the US and internationally and some early reports suggesting an increase in cancer among heavy users of cell phones. "At that time, animal experiments were deemed crucial because meaningful human exposure health data from epidemiological studies were not available." [Toxicology and Carcinogenesis Studies in Hsd:Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones]. Over the next 10 years, the NTP established collaborations with key biophysical investigators (e.g., the National Institute of Standards and Technology) and built a novel exposure system working closely with engineers from top institutions around the world. During this time, there were many biological effects reported in peer-reviewed publications involving laboratory animals and in mechanistic, *in vitro* studies. Effects from radiofrequency radiation (RFR) such as genetic toxicity, immunotoxicity, oxidative stress, changes in gene and protein expression, changes in cell differentiation and proliferation, and increased permeability of the blood brain barrier were reported in these publications. Additionally, human exposure to RFR expanded beyond just the use of cell phones and the number of users of all ages continues to increase.

In 2009, NTP began their 3-phase general toxicology research program involving the same kind of exposure to RFR used in 2G and 3G cellphones (the standard of that time). It is important to note that 5G contains frequencies used in 2G and 3G RFR. Phase I involved pilot and thermal studies; phase II involved the pre-chronic studies; and phase III was the chronic bioassay and genetic toxicity assessment. The phase I studies established that non-thermal levels (<1^{o}C or no detectible change in temperature) of RFR exposure had toxicological implications in biological systems. They also established NTP's credibility in the field of RFR research.

ALL NTP studies undergo extensive internal and external peer review, from protocol development to 3-level pathology evaluation to statistical analyses to final report. In fact, the external peer review of the RFR technical reports, held in March of 2018, lasted for 3 days, instead of the usual <2 because of the complexity and detail of this study. The technical reports were published in 2019, as well as a series of peer-reviewed scientific publications.

The NTP found and published evidence of DNA damage after only 90 days of exposure in the brains of both rats and mice and in white blood cells of mice. There was decreased survival of pups at higher exposures and decreases in body weights of both the mothers and the pups after exposure during pregnancy. In the 2-year study, clear evidence of tumors in the hearts, malignant schwannomas akin to acoustic neuromas reported in epidemiology studies, were exposure related in male rats. In addition to the heart tumors, there were other pathological changes (cardiomyopathy) in the hearts of both male and female rats. There was some evidence of tumors in the brains. Malignant gliomas, parallel to glioblastomas reported in human studies were also found in male rats as were tumors of the adrenal glands (pheochromocytomas). The evidence for additional cancers in female rats and mice was equivocal. The lowest exposure level used in these studies was equal to the maximum local tissue exposure allowed for cell phone users by the FCC; the highest exposure (1.6W/kg) was only four times higher than the maximum permitted in the US for the public. However, all exposures were lower than the maximum permitted (8 W/kg) for occupational exposures. The entire body of the rodents was exposed for 9 hours a day, at 10-minute intervals. The heart is one of the tissues which was predicted to absorb the most radiation.

Although the exposed rats seemed to live longer than the unexposed rats, detailed analysis indicated that there was no statistical difference in survival between control male rats and the exposure group with the highest rate of gliomas and heart schwannomas (CDMA-exposed male rats). [Melnick R. Regarding ICNIRP'S Evaluation of the National Toxicology Program's Carcinogenicity Studies on Radiofrequency Electromagnetic Fields. Health Phys. 2020;118(6):678-682. doi:10.1097/HP.0000000000001268] Furthermore, not a single one of the control rats had glial cell hyperplasia (potential precancerous lesions that can progress to a malignant glioma) or heart schwannomas, even though glial cell hyperplasia was detected in exposed rats as early as week 58 of the 2-y study, and heart schwannoma was detected as early as week 70 in exposed rats. Thus, survival was sufficient to detect tumors or pre-cancerous lesions in the brain and heart of control rats. [Melnick R. Regarding ICNIRP'S Evaluation of the National Toxicology Program's Carcinogenicity Studies on Radiofrequency Electromagnetic Fields. Health Phys. 2020;118(6):678-682. doi:10.1097/HP.0000000000001268]

The utility of the NTP investigations has been documented in several publications. [Melnick RL. Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects. Environ Res. 2019;168:1-6. doi:10.1016/j.envres.2018.09.010 In FCC Docket https://ecfsapi.fcc.gov/file/1001332406626/Melnick-Commentary%20on%20the%20utility%20of%20the%20National%20Toxicology%20Program%20study.pdf] The overall study was designed consistent with longstanding protocols devised in several hundred NTP studies of toxic agents produced since 1978. The NTP studies tested nonthermal levels of RFR for toxicologic potential including carcinogenic activity and relied on controlled chronic exposures to levels of RFR that do not significantly increase temperature. Carcinogenic activity was found.

NTP studies on RFR are continuing to address some of the findings observed in the 2-year studies including understanding the associations observed between non-thermal RFR exposure and toxicity and carcinogenicity. Several areas currently under investigation include stress and behavior, further evaluations of the heart, brain, and adrenals, the role of heat in the effects, DNA damage and

repair, and establishing biomarkers of exposures/toxicity to apply to studies of newer and emerging RFR-based communication technologies.

Since completion of the NTP "cell phone" studies, there have been several studies published including the Ramazzini Institute [Falcioni et al. 2018, "Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz base station environmental emission" Environmental Research] also finding an increase in heart schwannomas and brain gliomas in rats.

Overall, the NTP findings demonstrate the potential for RFR to cause cancer in humans. The independent peer review of the entire proceedings carried out by toxicologists, pathologists and statisticians independent of the NTP staff conducted March 26-28, 2018, concluded that there was "clear evidence of cancer," with respect to the schwannomas of the heart in male rats, and "some evidence of cancer" with respect to the gliomas in the male rats. In addition, that review also documented DNA damage in multiple organs along with preneoplastic lesions in cardiac and brain tissue. The DNA findings were later published by NTP scientists in another peer-reviewed publication with the conclusion: "exposure to RFR is associated with an increase in DNA damage." [Smith-Roe SL., et al., Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure, Environ Mol Mutagen 2020; 61 (2): 276-290]

References

1. Toxicology and Carcinogenesis Studies in Hsd:Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones, Referred to by FCC in December 4, 2019 19-126 Footnote 33 Link https://ntp.niehs.nih.gov/publications/reports/tr/500s/tr595/index.html?utm_source=direct&utm_medium=prod&utm_campaign=ntpgolinks&utm_term=tr595abs

2. Melnick R. Regarding ICNIRP'S Evaluation of the National Toxicology Program's Carcinogenicity Studies on Radiofrequency Electromagnetic Fields. Health Phys. 2020;118(6):678-682. doi:10.1097/HP.0000000000001268, See also FCC filing "Critique of the

ICNIRP Note of September 4, 2018 Regarding Recent Animal Carcinogenesis Studies" https://ecfsapi.fcc.gov/file/107281098810734/Comments%20on%20ICNIRP%20Dr.%20Ronald%20Melnick%20%20(1).pdf

3. Melnick R. Regarding ICNIRP'S Evaluation of the National Toxicology Program's Carcinogenicity Studies on Radiofrequency Electromagnetic Fields. Health Phys. 2020;118(6):678-682. doi:10.1097/HP.0000000000001268

4. Melnick RL. Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects. Environ Res. 2019;168:1-6. doi:10.1016/j.envres.2018.09.010 Link in FCC Docket https://ecfsapi.fcc.gov/file/1001332406626/Melnick-Commentary%20on%20the%20utility%20of%20the%20National%20Toxicology%20Program%20study.pdf

5. Falcioni et al. 2018, "Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz base station environmental emission" Environmental Research link in FCC docket https://ecfsapi.fcc.gov/file/10913119016386/Report%20of%20final%20results%20regarding%20brain%20and%20heart%20tumors%20in%20Sprague-Dawley%20rats%20exposed%20from%20prenatal%20life%20until%20natural%20death%20to%20mobile%20phone%20radiofrequency%20field%20representative%20of%20a%201.8%20GHz%20GSM%20base%20station%20environmental%20emission.pdf

6. Smith-Roe SL., et al., Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure, Environ Mol Mutagen 2020; 61 (2): 276-290 NTP study Referred to by FCC in December 4, 2019 19-126 Footnote 33

CONCLUSION

The Court should reverse the FCC's decision.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Rule 29(d) of the Federal Rules of Appellate Procedure because this brief contains 3154 words, excluding the parts of the brief exempted by Rule 32(a)(7)(B)(iii) of the Federal Rules of Appellate Procedure and Circuit Rule 32(a)(2).

This brief complies with the typeface and type-style requirements of Federal Rules of Appellate Procedure 32(a)(5) and 32(a)(6) because the brief has been prepared using Microsoft Word 2013 in 14-point Cambria font, which is a proportionately spaced typeface.

/s/ Stephen L. Goodman

Stephen L. Goodman

CERTIFICATE OF SERVICE

I hereby certify that on August 5, 2020, I electronically filed the foregoing, along with a Motion For Leave To File Brief Of Amicus Curiae Joseph Sandri In Support Of Petitioners Urging Reversal, with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit using the CM/ECF system, which will send notice of such filing to all counsel who are registered CM/ECF users.

/s/ Stephen L. Goodman
Stephen L. Goodman